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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/563,407	01/04/2006	Dierk Hein	AG010	4560
7590 04/25/2007 Craig Hallacher Continental Teves Inc One Continental Drive Auburn Hills, MI 48326			EXAMINER ZHU, JOHN X	
			ART UNIT 2858	PAPER NUMBER

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/25/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/563,407

Applicant(s)

HEIN, DIERK

Examiner

John Zhu

Art Unit

2858

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 1/29/2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 20-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 20, 21, 23 and 29-31 is/are rejected.
- 7) ☒ Claim(s) 22, 24-28, 32 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 January 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Response to communications filed 1/29/2007.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 20, 21, 23, 29, 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Broome in view of Kurokawa et al. (5,496,101), Archer et al. (5,825,216) and Eckert (5,951,119).

With respect to claims 20, 21, 30 and 31, Broome discloses all aspects of the claim including a device and method for determining a pressure in a region which is closed off by a solenoid valve (Fig. 2, element A), having a control unit (Fig. 1, element 20) for applying a voltage to the valve, wherein the control unit determines a peak point representing a switching current at which the valve switches to an open position and value of the current (Fig. 4).

Broome does not explicitly disclose determining the pressure on the basis of the peak point. Broome also does not explicitly disclose generating output information representative of the pressure, however, outputting a signal representative of pressure is not uncommon in the field of pressure measuring, as is exemplified by Eckert (Column 7, lines 54-55).

Kurokawa discloses the pressure of a chamber being proportional to the current of the solenoid (Fig. 2). However, this is a simplified model that does not take into account the effect of mutual inductance. Archer discloses that the spool value actually moves after a peak current value is reached in the solenoid (Column 1, lines 49-51). Hence, the proportional relationship approximately holds *after* a local peak current is detected on the solenoid.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Broome to incorporate the approximately proportional pressure and current concept as taught by Kurokawa and Archer to determine pressure for the purpose of control pressure in a vehicle braking system (Column 1, lines 7-8), and further obvious to modify Broome, Kurokawa and Archer to include the pressure output as taught by Eckert for the purpose of outputting a value for pressure controlling purposes.

With respect to claim 23, it is inherent that all determination steps are done by some type of calculation.

With respect to claim 29, although the Broome, Kurokawa or Archer does not explicitly disclose the region being a working volume of a gas spring, it is well known in the art that the theoretical principle behind both a gas spring and the brake system of Broome are nearly identical and involves solenoid electromagnetically controlling a spool/valve with a spring system that releases or adds pressure to a volume.

Accordingly, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Broome into a gas spring system for the purpose of controlling pressure in a gas spring system.

Allowable Subject Matter

4. Claims 22,24-28 and 32 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. The following is a statement of reasons for the indication of allowable subject matter: Claim 22 is allowable over the art of record because the prior art does not teach or render obvious the entire combination including a method for measuring a pressure in a region which is closed off by a solenoid valve wherein the pressure is determined by means of a family of characteristic curves.

Claim 32 is allowable over the art of record because the prior art does not teach or render obvious the entire combination including specifically a control unit that is capable of increasing step by step a PWM ratio of voltage applied to the valve and determining the pressure based on the PWM ratio at the peak point.

Claim 24 is allowable over the art of record because the prior art does not teach or render obvious the entire combination including specifically a method for measuring a

pressure where a voltage is applied to a solenoid valve and increased step by step by increasing a PWM ratio step by step, and wherein the pressure is determined on the basis of the PWM ratio at the peak point.

Response to Arguments

6. Applicant's arguments filed 1/29/2007 regarding the 35 USC 102 and 103 rejections have been fully considered but they are not persuasive.

In response to arguments regarding current control, applicant states, "Broome controls the coil current, not the voltage." (multiple instances, pages 6 and 7). However, since a current is applied to the solenoid, a voltage is also inherently applied as well. Applicant further states, "Broome's peak point is not the observed result of the valve armature moving but is actively generated by a control unit lowering the current after the valve has opened." (multiple instances, pages 6 and 7). The examiner disagrees and points to Fig. 4, in which a first peak value is established prior to the lowering of the current and contends that this is the peak point of interest and represents the starting point of when the armature starts to move (the dip is caused by the induced voltage of the moving armature).

The examiner's rejection of the independent claims could be viewed in 3 steps. First, Broome is used to teach that in a solenoid system, it is not uncommon to apply a current/voltage and measure the current/voltage on the solenoid coils. Second, Kurokawa is used to teach that there is a direct relationship between the pressure of a solenoid system and the current in the solenoid coil. With this relationship and in

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addition to the teaching of monitoring the current of Broome, one of ordinary skill in the art would be motivated to know that the current in the coils could be used to determine the pressure, and vice versa. Lastly, Archer is used to provide the teaching that a peak current is the point at which the armature actually moves (due to induced voltages of the moving armature), so the relationship between any force and current would be a direct relationship (Kurokawa) after this peak point. Hence, one of ordinary skill in the art would be motivated to use the teachings of Broome and Kurokawa after the detection of the peak point as taught by Archer to arrive at the claimed invention.

Furthermore, with respect to the argument that Archer uses a normally open valve unlike the present invention and is solely representative of the spring force (Page 7, paragraphs 3 and 6), it is moot considering Archer is used to teach the movement of armature/spool and the peak current.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yamaki et al. (6,378,473 B2) discloses a method of controlling a valve unit that discloses applying a voltage and measuring current (Fig. 3).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Zhu whose telephone number is (571) 272-5920. The examiner can normally be reached on M-F, 8-4:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Hirshfeld can be reached on (571) 272-2168. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



ANJAN DEB
PRIMARY EXAMINER

JZ

John Zhu
Examiner
Art Unit 2858

